In the Claims:

Please enter the following amended set of claims:

1. (Currently amended) A method of monitoring the integrity of a structure disposed in an environment containing a fluid at an ambient pressure, said structure comprising an abutment between two structural elements and having at least one internal ~~permeable~~ cavity in fluid communication with the abutment, said method comprising the steps of:

providing a source of a first fluid at a first pressure greater than said ambient pressure;

placing said at least one ~~permeable~~ cavity in fluid communication with said source;

coupling a high fluid flow impedance in series between said at least one ~~permeable~~ cavity and said source, said impedance being sufficiently high to create a pressure differential between said at least one ~~permeable~~ cavity and said source resulting from a breach in one of the structural elements adjacent the abutment in fluid communication with the cavity ~~minuscule flow of said first fluid therethrough due to permeation of said first fluid through said at least one permeable cavity~~;

allowing said pressure differential to stabilize to form a steady state pressure differential between said source and said at least one ~~permeable~~ cavity; and

monitoring for a change in said steady state differential pressure.

2. (Original) The method according to claim 1 wherein, said first fluid source pressure is substantially constant with respect to said ambient pressure.

3. (Canceled)

4. (Original) The method according to claim 1 wherein, said step of providing said first fluid source at said first pressure includes setting said first pressure at a level which is sufficiently greater than said ambient pressure to overcome hygroscopic force and capillary action, but not sufficient to be detrimental to the integrity of said structure.

5. (Original) The method according to claim 4 wherein, said step of providing said source of first fluid comprises providing a source of a first gas.

6. (Original) The method according to claim 5 wherein, said step of providing said first gas includes providing a moisture trap between said source and said at least one cavity to dry said gas prior to flowing into said at least one cavity.

7. (Original) The method according to claim 1 wherein, when said structure includes two or more internal cavities, said placing step includes one or both of (a) placing said internal cavities in fluid communication with each other; and (b) placing said cavities in fluid communication with said source.

8,9. (Canceled)

10. (Original) The method according to claim 1 wherein, said step of monitoring for a change in steady state inflow includes:

providing a supply of a detectable gas in fluid communication with said source;

providing a detecting means for said gas; and

monitoring for a change in a steady state rate of seepage of said gas from said structure.

11-28. (Canceled)

29. (Currently amended) A method of monitoring the integrity of a structure disposed in an environment containing a fluid at an ambient pressure, said structure comprising an abutment between two structural elements, said method including the steps of:

providing a source of a first fluid at a first pressure greater than said ~~second~~ ambient pressure;

placing said source in fluid communication with one or more ~~permeable~~ cavities provided on or in said structure, said cavities in fluid communication with the abutment;

coupling a high fluid flow impedance in series between said at least one ~~permeable~~ cavity and said source, said impedance being sufficiently high to create a pressure differential between said at least one ~~permeable~~ cavity and said source resulting from a ~~minuscule flow of said first fluid therethrough due to permeation of said first fluid through said at least one permeable cavity~~ breach in one of the structural elements adjacent the abutment in fluid communication with the cavity;

allowing said pressure differential to stabilize to form a steady state pressure differential between said source and said at least one ~~permeable~~ cavity; and

monitoring for a change in said steady state differential pressure.

30. (Withdrawn) The method according to claim 29 wherein said step of placing said source in fluid communication with one or more cavities provided on or in said structure includes forming said one or more cavities on or in said structure.

31. (Withdrawn) The method according to claim 30 wherein said step of forming said one or more cavities includes forming a recess or depression in or on said structure and forming a seal across said recess or depression.

32. (Withdrawn) The method according to claim 30 wherein said step of forming said one or more cavities includes constructing said structure as an ensemble of two or more components which are coupled together, said components juxtaposed relative to each other in a manner so that a surface of one component is adjacent to a surface of at least one other of said components to form respective adjacent surface pairs, and forming said one or more cavities between one or more of said adjacent surface pairs.

33. (Withdrawn) The method according to claim 32 further including the step of placing alternate ones of said cavities in fluid communication with said ambient pressure to produce adjacent interspersed source pressure cavities and ambient pressure cavities.

34. (Withdrawn) The method according to claim 33 further including the step of placing a moisture trap in series connection between said ambient pressure cavities and said environment or a source of said ambient pressure.

35. (Withdrawn) The method according to claim 32 wherein, said monitoring step includes coupling a high fluid flow impedance in series between said source pressure cavities and said source, to create a steady state differential pressure between said source pressure cavities and said source, and monitoring for a change in said steady state differential pressure.

36. (Withdrawn) The method according to claim 32 wherein, said monitoring step includes providing a supply of a fluid marker in fluid communication with said first fluid source and monitoring said structure for traces of said fluid marker.

37. (Withdrawn) The method according to claim 32 wherein, when said components of said structure, are coupled together by a layer of adhesive, or incorporate a layer of sealing material between said adjacent surface pairs, said forming step includes forming said cavities in said adhesive or sealing layer.

38. (Withdrawn) The method according to claim 32 wherein, where said components are coupled together by mechanical fasteners, said forming step includes providing a seal about said adjacent pairs to form said cavities between said adjacent surface pairs.

39. (New) A method of monitoring the integrity of a structure disposed in an environment containing a fluid at an ambient pressure, said structure comprising at least two elements and at least one joiner joining the at least two elements together, the structure having at least one internal cavity in fluid communication with the at least two elements and the joiner, said method comprising the steps of:

providing a source of a first fluid at a first pressure greater than said ambient pressure;

placing said at least one cavity in fluid communication with said source;

coupling a high fluid flow impedance in series between said at least one cavity and said source, said impedance being sufficiently high to create a pressure differential between said at least one cavity and said source resulting from a breach in at least one of the at least two elements and the joiner in fluid communication with the cavity;

allowing said pressure differential to stabilize to form a steady state pressure differential between said source and said at least one cavity; and

monitoring for a change in said steady state differential pressure.

40. (New) The method according to claim 39, wherein said first fluid source pressure is substantially constant with respect to said ambient pressure.

41. (New) The method according to claim 39, wherein said step of providing said first fluid source at said first pressure includes setting said first pressure at a level which is sufficiently greater than said ambient pressure to overcome hygroscopic force and capillary action, but not sufficient to be detrimental to the integrity of said structure.

42. (New) The method according to claim 41, wherein said step of providing said source of first fluid comprises providing a source of a first gas.

43. (New) The method according to claim 42, wherein said step of providing said first gas includes providing a moisture trap between said source and said at least one cavity to dry said gas prior to flowing into said at least one cavity.

44. (New) The method according to claim 39, wherein when said structure includes two or more internal cavities, said placing step includes one or both of (a) placing said internal cavities in fluid communication with each other; and (b) placing said cavities in fluid communication with said source.

45. (New) The method according to claim 39, wherein said step of monitoring for a change in steady state inflow includes:

providing a supply of a detectable gas in fluid communication with said source;

providing a detecting means for said gas; and

monitoring for a change in a steady state rate of seepage of said gas from said structure.

46. (New) A method of monitoring the integrity of a structure disposed in an environment containing a fluid at an ambient pressure, said structure comprising at least

two elements and at least one joiner joining the elements together, said method including the steps of:

providing a source of a first fluid at a first pressure greater than said ambient pressure;

placing said source in fluid communication with one or more cavities provided on or in said structure, said cavities in fluid communication with the at least two elements and the joiner;

coupling a high fluid flow impedance in series between said at least one cavity and said source, said impedance being sufficiently high to create a pressure differential between said at least one cavity and said source resulting from a breach in at least one of the two elements and the joiner in fluid communication with the cavity;

allowing said pressure differential to stabilize to form a steady state pressure differential between said source and said at least one cavity; and

monitoring for a change in said steady state differential pressure.

47. (New) The method according to claim 46, wherein said first fluid source pressure is substantially constant with respect to said ambient pressure.

48. (New) The method according to claim 46, wherein said step of providing said first fluid source at said first pressure includes setting said first pressure at a level which is sufficiently greater than said ambient pressure to overcome hygroscopic force and capillary action, but not sufficient to be detrimental to the integrity of said structure.

49. (New) The method according to claim 48, wherein said step of providing said source of first fluid comprises providing a source of a first gas.

50. (New) The method according to claim 49, wherein said step of providing said first gas includes providing a moisture trap between said source and said at least one cavity to dry said gas prior to flowing into said at least one cavity.

51. (New) The method according to claim 46, wherein when said structure includes two or more internal cavities, said placing step includes one or both of (a) placing said internal cavities in fluid communication with each other; and (b) placing said cavities in fluid communication with said source.

52. (New) The method according to claim 46, wherein said step of monitoring for a change in steady state inflow includes:

providing a supply of a detectable gas in fluid communication with said source;

providing a detecting means for said gas; and

monitoring for a change in a steady-state rate of seepage of said gas from said structure.